

MATERNAL CARE, FOOD PLANTS AND DISTRIBUTION OF AUSTRALIAN ONCOMERINAE (HEMIPTERA: HETEROPTERA: TESSARATOMIDAE)

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Abstract

New information is given on maternal care, host plants and distribution for 9 Australian Tessaratomidae: Oncomerinae in the genera *Cumare* Blöte, *Garceus* Distant, *Lyramorpha* Westwood, *Musgraveia* Leston & Scudder, *Oncoscelis* Westwood, *Peltocopta* Bergroth, *Plisthenes* Stål and *Stilida* Stål. Corrections to some recorded distributions and host plants are discussed and a summary table of data for all 15 Australian species is presented.

Introduction

The subfamily Oncomerinae of the Tessaratomidae comprises 15 genera of large, often colourful, shield bugs. It has its greatest generic diversity (12 genera) in Australia (Sinclair 2000). Species of *Oncomeris* Laporte are the largest shield bugs in the world, one of which, *O. flavicornis* (Guérin), occurs in northern Queensland. Cassis and Gross (2002) listed 18 species from Australia but three of these (*Lyramorpha perelegans* Vollenhoven, 1868, *L. diluta* Stål, 1863 and *Oncomeris ostraciopertus* (Montrouzier, 1855)) are based on literature records from the 1800s which have never been confirmed, so the fauna is probably only the 15 species listed in Table 1. They can be readily identified using the generic key of Sinclair (2000) and the species keys of Leston and Scudder (1957). All species are restricted to the eastern parts of Queensland and New South Wales. Old records from Tasmania, Victoria and South Australia (Gross 1975, Cassis and Gross 2002) have not been verified in modern times and are not considered here. All species except *Cumare pallida* Blöte, 1945 and *Agapophyta bipunctata* Guérin, 1831 are virtually restricted to rainforests.

The group is well known for the parental care of eggs and nymphs shown by some species, first observed by the pioneer Australian naturalist F. P. Dodd (Dodd 1904, 1916), with later records by Kumar (1969) and Sinclair (2000). Previous observations were summarised by Monteith (2006), who gave new information on several species with photographs of parental behaviour and discussion of its significance. In the most advanced forms (*Cumare* Blöte, *Garceus* Distant and *Peltocopta* Bergroth), the female carries the nymphs on her abdomen for a significant period of time. This so-called 'nymphal phoresy' is also seen in certain SE Asian Tessaratomini (Gogala *et al.* 1998).

Oncomerines feed on the sap of woody plants, especially from apical shoots when in flush growth. All species have a rather narrow host range. *Musgraveia sulciventris* (Stål, 1863), the Bronze Orange-Bug, which feeds on native species of *Citrus* L. (Rutaceae), has become a pest of cultivated



Figs 1-6. Oncomerinae. (1-4) *Lynamorpha parens*: (1) female and large nymphs feeding at stem internode of *Castanospora alphandii*; (2) female brooding 2nd instar nymphs; (3) gregarious group of 2nd and 3rd instar nymphs on non-food plant, *Passiflora*; (4) adults feeding on *Jagera pseudorhus* (5-6) *Oncoscelis australasiae* on *Medicosma cunninghamii*: (5) female brooding egg clutch; (6) eggs in clutch of 14. Photos: A. Gillanders (1, 3), D. C. F. Rentz (2), K. Aland (4), J. Wright (5-6).

citrus and is well studied (Cant *et al.* 1996a, 1996b). Recorded food plants for other Australian species are given by Kumar (1969), Sinclair (2000), Cassis and Gross (2002) and Monteith (2006). A North Dakota State University website (Rider 2010) lists all recorded food plants but without assessing veracity. Some literature records of food plants are clearly simply resting records and caution is needed in recording food plants in the absence of actual feeding.

This paper records new information and/or photographs for nine species of Australian Oncomerinae. Several doubtful food plant records are excluded and a summary table of details for all Australian species is presented (Table 1). Plant nomenclature is taken from Henderson (2002). Vouchers for many of the insects mentioned are in the Queensland Museum (QM), Brisbane.

***Cumare pallida* Blöte, 1945**

Eggs have been recorded (Monteith 2006) but not measured. Those from a preserved clutch from Auburn River NP (in QM) are barrel shaped, 1.2 mm high and 1.1 mm in diameter. Micropyles not countable.

***Garceus fidelis* Distant, 1893**

Eggs in a hatched clutch of 14 eggs from Garradunga (in QM) are 1.5 mm high and 1.7 mm in diameter. Micropyles not countable.

***Lynamorpha rosea* Westwood, 1837**

Lynamorpha Westwood has two species in Australia: *L. rosea* in NSW and southern Queensland with 4 antennal segments and *L. parens* Breddin in northern Queensland with 5 antennal segments. *L. rosea* has been recorded from five genera of the Sapindaceae (Table 1), four of them native plus the cultivated lychee (*Litchi chinensis* Sonn.). Kumar (1969) found brooding females on *Alphitonia* Reissek ex Endl. (Rhamnaceae) and *Flindersia* R. Br. (Rutaceae) in Brisbane but this record has not been repeated for these common trees in 40 years and they are deleted as host plants pending confirmation. Similarly, the early record from *Synoum glandulosum* (Sm.) A. Juss. (Meliaceae) by Musgrave and Whitley (1931) requires confirmation as this is not a 'beach plant' as described and might be a misidentification of the confirmed food plant *Cupaniopsis anacardioides* (A. Rich.) Radlk., which is a beach plant at the site and has similar leaves and fruit.

***Lynamorpha parens* Breddin, 1900 (Figs 1-4)**

No native food plants have been recorded for this species. During April 2010, Mr Alan Gillanders recorded it from the following six species of rainforest Sapindaceae at three localities on the northern Atherton Tableland: *Arytera divaricata* F. Muell. (Atherton), *A. pauciflora* S.T. Reynolds (Yungaburra), *Castanospora alphanthii* (F. Muell.) F. Muell. (Yungaburra), *Guioa acutifolia* Radlk. (Lake Eacham), *G. lasioneura* Radlk. (Yungaburra), *Sarcotoechia serrata* S.T. Reynolds (Yungaburra). Mr Garry Sankowsky recorded it from the

Table 1. List of confirmed Australian Oncomerinae showing recorded information on distribution, host plants, egg clutch size and aspects of brood care. Queensland is divided into 4 latitudinal zones: SQ, from NSW border to 22°S; NQ, from 16-22°S; CYP, from 16°S to tip of Cape York; TS, Torres Strait Islands. Blank cells indicate no

SPECIES AND SOURCE LITERATURE	AUSTRALIAN DISTRIBUTION	AUSTRALIAN FOOD PLANT FAMILIES & GENERA
<i>Agapophyta bipunctata</i> Guérin, 1831 (1,3,6)	NQ, CYP, TS	CAESALPINIACEAE: <i>Cassia</i>
<i>Cumare pallida</i> Blöte, 1945 (3,4,6,8)	SQ, NQ, CYP	EUPHORBIACEAE: <i>Petalostigma</i>
<i>Erga longitudinalis</i> (Westwood, 1837) (1)	NSW, SQ	FABACEAE: <i>Austrorhynchus</i>
<i>Garceus fidelis</i> Distant, 1893 (3,4,6)	NQ	ELAEOCARPACEAE: <i>Elaeocarpus</i>
<i>Lynamorpha rosea</i> Westwood, 1837 (1,3,4,5)	NSW, SQ	SAPINDACEAE: <i>Alectryon</i> , <i>Atalaya</i> , <i>Cupaniopsis</i> , <i>Guioa</i> , <i>Litchi</i>
<i>Lynamorpha parens</i> Breddin, 1900 (6,7,8)	NQ, CYP, TS	SAPINDACEAE: <i>Alectryon</i> , <i>Arytera</i> , <i>Castanospora</i> , <i>Cupaniopsis</i> , <i>Elattostachys</i> , <i>Guioa</i> , <i>Jagera</i> , <i>Litchi</i> , <i>Nephelium</i> , <i>Sarcotoechia</i>
<i>Musgraveia antennatus</i> (Distant, 1880) (8)	CYP, TS	RUTACEAE: <i>Citrus</i>
<i>Musgraveia sulciventris</i> (Stål, 1863) (1,3,6)	NSW, SQ	RUTACEAE: <i>Citrus</i>
<i>Oncomeris flavicornis</i> (Guérin, 1831)	NQ, CYP	-
<i>Oncoscelis australasiae</i> Westwood, 1837 (3,8)	NSW, SQ	RUTACEAE: <i>Acronychia</i> , <i>Medicosma</i> , <i>Melicope</i>
<i>Peltocopta crassiventris</i> (Bergroth, 1895) (1,6,8)	NSW, SQ	EUPHORBIACEAE: <i>Mallotus</i>
<i>Plisthenes australis</i> Horváth, 1900 (3,6,8)	NQ, CYP	MELIACEAE: <i>Aglaia</i>
<i>Stilida indecora</i> Stål, 1863 (1,3,6)	NSW, SQ, NQ	SAPINDACEAE <i>Alectryon</i> , <i>Arytera</i> , <i>Cupaniopsis</i> , <i>Guioa</i>
<i>Stilida sinuata</i> Stål, 1870	CYP	-
<i>Tibiospina darlingtoni</i> Sinclair, 2000	NQ	-

information. Literature sources for each species are as follows: 1, Kumar 1969; 2, Cant *et al.* 1996a, b; 3, Sinclair 2000; 4, Cassis and Gross 2002; 5, Waite and Hwang 2002; 6, Monteith 2006; 7, Astridge 2006; 8, Monteith, this paper.

EGG CLUTCH	EGG BROODING	BROODING 1ST INSTARS	BROODING 2ND INSTARS	NYMPHAL PHORESY
14	Yes			No
14	Yes	Yes	Yes	Yes
24-26	Yes			No
14	Yes	Yes	-	Yes
up to 42	Yes	-	-	No
40-42	Yes	Yes	Yes	No
-	-	-	-	-
14	No	No	No	No
-	-	-	-	-
14	Yes	?Yes		No
24-39	Yes	Yes	Yes	Yes
-	-	-	-	-
40-42	Yes	Yes	-	No
-	-	-	-	-
-	-	-	-	-

following seven additional Sapindaceae planted on his property, 8.5 km NNW of Atherton: *Alectryon coriaceus* (Benth.) Radlk., *A. semicinerus* (F. Muell.) Radlk., *Cupaniopsis anacardioides* (A. Rich.) Radlk., *C. diploglottoides* Adema, *C. flagelliformis* (F.M. Bailey) Radlk. var. *flagelliformis*, *Elattostachys megalantha* S.T. Reynolds, *E. microcarpa* S.T. Reynolds. The author recorded it feeding on *Jagera pseudorhus* (A. Rich.) Radlk. (Sapindaceae) at Iron Range in December 2010 (Fig. 4). *Lyramorpha parens* also feeds on the exotic sapindaceous fruit trees lychee (specimens in the Mareeba DPI collection from Innisfail) and rambutan, *Nephelium lappaceum* L. (Astridge 2006), but is not of pest status. Thus both Australian species of *Lyramorpha* apparently feed exclusively on Sapindaceae. Fig. 1 shows an adult and several late stage nymphs feeding together at an internode of *Castanopora alphandii*.

Gende and Kumar (2001) listed *Dodonea viscosa* Jacq., plus a variety of non-sapindaceous plants, from label data of New Guinea specimens identified as *Lyramorpha parens*. However, both the identity of the *Lyramorpha* and the feeding status of the plant records need confirmation and will not be pursued for this Australian treatment.

The only breeding behaviour noted previously has been of a female brooding a clutch of 40 eggs (Monteith 2006). A photograph taken at Kuranda by Dr David Rentz (Fig. 2) shows a female standing guard over about 20 uniformly sized nymphs. First instars in Oncomerinae are invariably subglobose in shape and become flattened when they moult to second instar (Kumar 1969, Monteith 2006). In *L. rosea* the nymphal colour pattern changes from chequered red and black in first and second instars to uniform red in the older instars (Kumar 1969); this also seems to be the case in *L. parens*. Based on the size of the nymphs in Fig. 2, their flattened form and their colour pattern, it can be assumed that they are second instars. This is evidence that *L. parens* broods its young beyond moulting to the second instar.

Observations by Alan Gillanders show that the older nymphs of *L. parens* form massed groups, which feed together and frequently move in close-packed groups to new feeding sites when old sites are exhausted. They are often to be found on non-host plants while in transit (Fig. 3). Clearly, their brilliant aposematic colours reinforce the group defence they enjoy from their dorsal defence glands during these exposed journeys. This feeding strategy contrasts with that of oncomerines such as *Cumare* and *Peltocopta*, which have solitary, camouflaged and rather sedentary later-stage nymphs (Monteith 2006).

***Musgraveia antennatus* (Distant, 1880)**

The southern citrus pest, *Musgraveia sulciventris*, feeds solely on native and cultivated species of *Citrus* (Rutaceae), including species of 'native limes' previously included in the genera *Eremocitrus* Swingle and *Microcitrus*

Swingle, now placed in *Citrus* (Henderson 2002). The rare *Musgraveia antennatus* is found only in Torres Strait (Moa Island) and northern Cape York Peninsula. Sinclair (2000) recorded it from cultivated West Indian Lime (*Citrus aurantiifolia* (Christm.) Swingle) and there is a record from cultivated Pomelo (*Citrus maxima* Merr.) at Lockhart River in the AQIS collection, Cairns (Sally Cowan pers. comm.). It overlaps with the native *Citrus garrawayi* F.M. Bailey in the southern part of its range (Iron Range) and this plant is a candidate for a natural host, but in the northern part of its range (Lockerbie, Torres Strait) there are no native *Citrus* (*vide* Australia's Virtual Herbarium, <http://www.ersa.edu.au/avh/> and Garry Sankowsky pers. comm.) and it must have a non-*Citrus* native host there. Mr Sankowsky suggests this may be the rutaceous *Zanthoxylum rhetsa* (Roxb.) DC, which is common in the region and used there by various citrus-breeding papilionid butterflies.

***Oncoscelis australasiae* Westwood, 1837 (Figs 5-9)**

Cassis and Gross (2002) restored the original generic name *Oncoscelis* Westwood for this species, instead of *Rhoecus* Bergroth or *Rhoecocoris* Bergroth which have usually been used in modern times (e.g. Leston and Scudder 1957, Sinclair 2000).

There are no published observations on the biology of this large but uncommon species apart from records on *Melicope micrococca* (F. Muell.) T.G. Hartley (Rutaceae) by Sinclair (2000). It has also been taken on *Melicope elleryana* (F. Muell.) T.G. Hartley on Stradbroke Island (pers. obs.). A specimen (in QM) from near Harrington, NSW, was taken on *Acronychia oblongifolia* (A. Cunn ex Hook.) Endl. ex Heynh (Rutaceae) by Geoff Williams, who reports that it also occurs there on *Acronychia imperforata* F. Muell. In February 2009, Chris Burwell (QM) discovered a colony feeding and breeding on *Medicosma cunninghamii* (Hook.) Hook. f. (Rutaceae) along upper Enoggera Creek near Brisbane.

Several adults from this last collection were brought to the Queensland Museum and maintained on the food plant in plastic bags. On 7 February, a female laid a batch of 14 eggs on the underside of a leaf and took up a guarding position over them (Fig. 5). The eggs were arranged in the standard 3,4,4,3 pattern (Fig. 6), which has been described for several other species (Monteith 2006). The eggs were large (3.2 mm diameter), spherical, with 46-48 micropyles, the largest number known for any oncomerine. The female abandoned the eggs during photography two days after deposition. They hatched on 20 February to give convex, non-feeding, white nymphs (Fig. 7) which clustered together in an immobile group until the night of 27 February, when all moulted to highly flattened, semi-transparent second instars (Fig. 8) which dispersed. This post-hatching nymphal behaviour indicates that the female would almost certainly have continued to brood the first instars until their moult, as is usually the case (Monteith 2006).



Figs 7-14. Oncomerinae. (7-9) *Oncoscelis australasiae* on *Medicosma cunninghamii*: (7) eggs hatching to 1st instar nymphs; (8) newly hatched 2nd instar and exuvium; (9) male showing enlarged hind legs. (10-12) *Peltocopta crassiventris*: (10) female from Toogoom; (11) 2nd instar on underside of *Mallotus discolor* leaf; (12) female being predated by grey butcher bird. (13-14) *Plisthenes australis*: (13) male (L) and female on *Aglaia meridionalis*; (14) two adults and a nymph on presumed *Aglaia sapindina*. Photos: J. Wright (7-9), M. Robinson (10-12), M. Cermak (13), G. Monteith (14).

***Peltocopta crassiventris* (Bergroth 1895) (Fig 10-12, 15)**

This extremely rare species has been known from a few coastal localities over a latitudinal range of 160 km between Iluka in New South Wales and Surfers Paradise in Queensland (Monteith 2006). Its only food plant is *Mallotus discolor* F. Muell. ex Benth. (Euphorbiaceae) and it exhibits the most advanced maternal care known in the family. In late March 2010, Mrs M. Robinson recorded the species from her garden at Toogoom (25.258°S152.696°E), which is on the coast 330 km further north. Females (Fig. 10) carrying both first and second instar nymphs (Fig. 11) were present. The author visited and confirmed that the host plants were *M. discolor* which was very abundant in this area of partly cleared remnant rainforest. This is a major range extension for this unique species.

In December 2010, Mrs Robinson noted many bugs on the same trees at Toogoom, with specimens commonly falling from overhanging *Mallotus* trees onto the driveway and verandahs of the house. This coincided with a heavy wet season and parallels the population outbreak of this usually rare species described by Monteith (2006) at Surfers Paradise in 1961 and for several years thereafter. Other observations by Mrs Robinson included several instances of the unique copulation posture adopted by this species, including one involving a female that was brooding a batch of 33 eggs at the time (Fig. 15). Although *Peltocopta* has the same acrid defense secretions shared by other oncomerines, a successful predation of a female by a grey butcher bird, *Cracticus torquatus* (Latham), was also noted (Fig. 12).



Fig. 15. *Peltocopta crassiventris*: male and female in copulation above a clutch of 33 eggs, which the female was brooding when copulation was initiated. Note the bright colours of the male (left) compared with the pallid female. Photo: M. Robinson.

***Plisthenes australis* Horváth, 1900 (Figs 13-14)**

Sinclair (2000) listed the locality of Byfield (22.858°S, 150.695°E) as the southern limit for this otherwise far northern tropical species. The specimen on which this is based has proved to be *Oncoscelis australasiae*, so the southern limit for *Plisthenes australis* is now confirmed as being 740 km further north at the Mulgrave River (17.34S°).

The only foodplant listed for this species is *Citrus*, in the Rutaceae (Sinclair 2000). This record is based on a single specimen taken from a planted West Indian Lime tree at Iron Range in 1978 by M. DeBaar (now in the Queensland Forestry Collection). This same individual tree is usually host for the related citrus-feeding *Musgraveia antennatus* (pers. obs.). *Citrus* is commonly available within the range of *Plisthenes* Stål so, without other feeding records, it seems best to treat this single specimen as just a resting record. Two confirmed host records are now available for *P. australis* on *Aglaia* Lour. in the Meliaceae: Michael Cermak photographed it on *Aglaia meridionalis* Pannell at Cape Tribulation in 2004 (Fig. 13) and the present writer took it feeding with nymphs on a plant identified by experienced field botanist Garry Sankowsky, from the May 1973 photograph taken at Lockerbie (Fig. 14), as almost certainly *Aglaia sapindina* (F. Muell.) Harms.

***Stilida indecora* Stål, 1863**

Monteith (2006) recorded and pictured a female brooding a clutch of 42 eggs which hatched into first instars. These nymphs dispersed because the food plant was dead, so it was not possible to be sure that normally they would have been brooded until the critical moulting from first to second instar. This has now been confirmed: in February 2007, a female (in QM) was taken on a species of *Arytera* in vine scrub at 'Toomba' station (19.966°S, 145.582°E), brooding a mass of nymphs on top of a hatched clutch of 36 eggs. There were 12 first instars and 20 seconds, demonstrating that female brooding does persist to the second instar.

Discussion

With the additions and corrections presented here we now have a relatively full body of reliable information on the biology and distribution of the 15 accepted species of Australian Tessaratomidae (Table 1). Host plants are known for 12 species and at least partial breeding behaviour is recorded for 10 species. Nothing of this behaviour is known for the giant, lowland, northern Queensland species *Oncomeris flavicornis* (Guérin, 1831), or for the curious endemic monotypic genus and species *Tibiospina darlingtoni* Sinclair, 2000, known from high altitudes in the Wet Tropics. The author would welcome observations on these or other species.

Australian oncomerines feed on a relatively limited range of plant taxa, comprising only seven families in four plant orders. All genera of oncomerines are restricted to a single plant family. In the Malvales, *Garceus*

occurs on Elaeocarpaceae; in the Fabales, *Agapophyta* Guérin and *Erga* Walker occur on the legume families Caesalpiniaceae and Fabaceae respectively; in the Euphorbiales both *Peltocopta* and *Cumare* feed on Euphorbiaceae; in the Sapindales, *Lynamorpha* and *Stilida* Stål feed on Sapindaceae; *Oncoscelis* and *Musgraveia* Leston & Scudder feed on Rutaceae; and *Plisthenes* on Meliaceae.

The Oncomerinae show five progressive levels of maternal care: (1), those that lay eggs and abandon them (*Musgraveia sulciventris*); (2), those in which the female broods the eggs until hatching (*Erga* and *Agapophyta*); (3), those in which the female continues to brood the sedentary first instars until they moult to second instars (*Stilida* and *Oncoscelis*); (4), those in which females continue to shepherd mobile second instars (*Lynamorpha parens*); (5), those in which the brooding female is modified to carry the first and second instars on her body after hatching (*Peltocopta*, *Cumare* and *Garceus*).

This study confirms that more species than previously suspected guard their young until the second instar. This supports the idea proposed by Monteith (2006) that maternal care is largely a device to protect the vulnerable, usually non-feeding, sub-globose first instars (Fig. 7) until they moult to the flattened, camouflaged second instars, which disperse and begin to feed (Figs 8, 11).

As evidence for maternal care in more species accumulates, the complete lack of parental care in *Musgraveia sulciventris* becomes more unusual. Maternal care slows the potential for rapid population increase because females invest time and energy in one egg clutch. Two of the three natural food plants of *M. sulciventris* are typical of dry vine forests (*Citrus australasica* F. Muell.) or of inland plains (*C. glauca* (Lindl.) Burkill), where rainfall and plant growth are seasonal and unreliable. For *M. sulciventris*, the loss of maternal care and the ability to produce multiple eggs clutches (Cant *et al.* 1996a) might give populations the ability to multiply rapidly in temporarily favourable conditions. This characteristic of the species may have pre-adapted it for the pest status it gained when cultivated citrus became available.

Acknowledgements

I am grateful to the following for allowing me to include their observations: Chris Burwell (QM, Brisbane), Michael Cermak (Cairns), Murdoch DeBaar (Brisbane), Alan Gillanders (Yungaburra), David Rentz (Kuranda), Meg Robinson (Toogoom), Garry Sankowsky (Tolga) and Geoff Williams (Lansdowne). Photos are by Michael Cermak, Meg Robinson, Alan Gillanders, Jeff Wright (QM, Brisbane) and David Rentz. Harry Fay (DEEDI, Mareeba) helped with information about lychee feeders.

References

- ASTRIDGE, D. 2006. *Rambutan - development of integrated pest management*. RIRDC Publication No 15/187; 59 pp.
- CANT, R.G., SPOONER-HART, R.N., BEATTIE, G.A.C. and MEATS, A. 1996a. The biology and ecology of the Bronze Orange Bug, *Musgraveia sulciventris* (Stål). A literature review. Part 1. Description, biology, host species and distribution. *General and Applied Entomology* 27: 19-29.
- CANT, R.G., SPOONER-HART, R.N., BEATTIE, G.A.C. and MEATS, A. 1996b. The biology and ecology of the Bronze Orange Bug, *Musgraveia sulciventris* (Stål). A literature review. Part 2. Feeding, control, defensive secretions, pheromones, reproduction and aggregation. *General and Applied Entomology* 27: 30-42.
- CASSIS, G. and GROSS, G.F. 2002. Hemiptera: Heteroptera (Pentatomoidea). In: Houston, W.W.K. and Maynard, G.V. (eds), *Zoological Catalogue of Australia*, Vol. 27.3B. CSIRO Publishing, Melbourne; xiv + 732 pp.
- DODD, F.P. 1904. Notes on maternal instinct in Rhynchota. *Transactions of the Entomological Society of London* 1904, pt iii, pp 483-486, plate 28.
- DODD, F.P. 1916. Observations on various insects in N. Queensland. *Transactions of the Entomological Society of London* 1916, pt i1, pp xxv-xxviii.
- GENDE, P. and KUMAR, R. 2001. Distribution and host plants of three genera of Papua New Guinean Oncomerinae (Heteroptera: Pentatomoidea: Tessaratomidae). *Science in New Guinea* 26(1-3): 46-51.
- GOGALA, M., YONG, H.-S. and BRÜHL, C. 1998. Maternal care in *Pygoplatys* bugs (Heteroptera: Tessaratomidae). *European Journal of Entomology* 95: 311-315.
- GROSS, G.F. 1975. *Plant-feeding and other bugs (Hemiptera) of South Australia. Heteroptera, Part 1*. A.B. James, Adelaide; 250 pp, 3 colour plates.
- HENDERSON, R.J.F. 2002. *Names and distribution of Queensland plants, algae and lichens*. Queensland Herbarium, Environmental Protection Agency; 280 pp.
- KUMAR, R. 1969. Morphology and relationships of the Pentatomoidea (Heteroptera) IV. Oncomerinae (Tessaratomidae). *Australian Journal of Zoology* 17: 553-606.
- LESTON, D. and SCUDDER, G.G.E. 1957. The taxonomy of the bronze orange-bug and related Australian oncomerinae (Hemiptera: Tessaratomidae). *Annals and Magazine of Natural History* 12: 439-448.
- MONTEITH, G.B. 2006. Maternal care in Australian oncomerine shield bugs (Insecta, Heteroptera, Tessaratomidae). Pp 1135-1152, in: Rabitsch, W. (ed.), Hug the bug - for the love of true bugs. Festschrift zum 70. Geburtstag von Ernst Heiss. *Denisia* 19: 1-1184.
- MUSGRAVE, A. and WHITLEY, G.P. 1931. Nature rambles at Trial Bay. *Australian Museum Magazine* 4: 149-155.
- RIDER, D. 2010. Plant host records. Tessaratomidae. (Accessed June 12 2010). http://www.ndsu.nodak.edu/ndsu/rider/Pentatomoidea/Hosts/plant_Tessaratomidae.htm
- SINCLAIR, D.P. 2000. A generic revision of the Oncomerinae (Hemiptera: Heteroptera: Tessaratomidae). *Memoirs of the Queensland Museum* 46(1): 307-329.
- WAITE, G.K. and HWANG, J.S. 2002. Pests of litchi and longan. Pp 331-359, in: Pena, J.E., Sharp, J.L. and Wysoki, M. (eds), *Tropical fruit pests and pollinators: biology, economic importance, natural enemies and control*. CAB Publishing, Wallingford; 430 pp.